



Entergy Nuclear Operations, Inc.  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043  
269-764-2000

**Otto W. Gustafson**  
Licensing Manager

PNP 2013-057

August 8, 2013

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Director, Spent Fuel Project Office  
Office of Nuclear Material Safety and Safeguards  
Washington, DC 20555-0001

Subject: Ventilation Storage Cask Inspection Summary Report

Palisades Nuclear Plant  
Dockets 50-255 and 72-7  
License No. DPR-20

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (ENO) is providing the summary report required by Section 1.3.3, of Attachment A, of the dry fuel storage (DFS) Certificate of Compliance.

Section 1.3.3 requires that the ventilated concrete cask (VCC) interior surfaces and the multi-assembly sealed basket (MSB) exterior surfaces of the first ventilated storage cask (VSC) placed in service be inspected after every five years in service. The inspection is to identify potential air flow blockage and material degradation. A report summarizing the findings is required to be submitted within 30 days from the conclusion of the inspection. The first VSC, serial number CVCC-24-01, was placed in service at the Palisades Nuclear Plant on May 12, 1993. The previous inspection was conducted in July 2008.

A remote visual inspection of the VCC interior surfaces was performed on July 9, 2013. Surfaces inspected included the VCC cooling air flow paths, the VCC liner interior and the MSB exterior. The inspection concluded:

1. The VSC cooling paths were free of air flow blockage.
2. The VCC interior surfaces and the MSB exterior surfaces were in good condition and considered to be normal for the VSC service environment and the specified materials of construction described in the Safety Analysis Report (SAR).
3. No additional degradation mechanisms affecting system performance were identified.

The inspection summary report is provided in Enclosure 1.

This letter contains no new commitments and no revisions to existing commitments.

A handwritten signature in black ink, appearing to read 'OWG/bed', with a long horizontal stroke extending to the right.

OWG/bed

Attachment 1: Ventilated Storage Cask Inspection Summary Report

CC Regional Administrator, USNRC, Region III  
Project Manager, USNRC, NRR  
NRC Resident Inspector – Palisades

# ATTACHMENT 1

## VENTILATED STORAGE CASK INSPECTION SUMMARY REPORT

### **PURPOSE**

This report summarizes the results of the ventilated concrete cask (VCC) interior surface inspection conducted on ventilated storage cask (VSC) serial number CVCC-24-01, which is the first VSC-24 cask placed in service at the Palisades Nuclear Plant (PNP). The VCC interior surfaces and the multi-assembly sealed basket (MSB) exterior surfaces of the first VSC placed in service are required to be inspected after every five years in service, as specified in Section 1.3.3, of Attachment A, of the VSC-24 Certificate of Compliance, to identify potential air flow blockage and material degradation.

### **DISCUSSION**

The VSC air flow cooling path surfaces that were inspected are the VCC air inlet and air outlet assemblies, the VCC interior and the MSB exterior. The VCC inlet, outlet, and interior surfaces are coated with Carboline Carbo Zinc (CZ)-11HS inorganic zinc primer and the MSB exterior surfaces are coated with a two-part coating system consisting of a CZ-11HS base coat and a Keeler & Long E-1-7155 epoxy enamel top coat.

#### **Inspection Equipment**

The inspection was performed using a GE Visual Inspection Custom quartz fiber 8496 probe with an internal light source to illuminate the surfaces for inspection. A monitor was used to view the surfaces and a DVD recorder was used to provide a record of the inspection.

#### **Inspection Methodology**

Access for the inspection of the VCC interior and the MSB exterior surfaces was achieved through the VCC air inlet and air outlet assemblies. The air inlet and air outlet protective screens were partially removed to facilitate entry of the video probe. The interior surfaces of the air outlet assemblies, the VCC liner interior, and the MSB exterior surfaces (which form the air flow annulus) down to the top of the air inlet hole in the floor of the VCC were inspected via access through the air outlet assembly. Then, the air inlet assemblies were inspected up to the air inlet hole in the floor of the VCC via access through the air inlet assemblies.

#### **Inspection Results**

The results are summarized below for the VSC cooling path (inlet, annulus, outlet) surfaces inspected.

### Air Outlet Assembly Interior Surfaces

The VCC liner outlet vents had areas of considerable rust bleed-through in areas where proper surface preparation was difficult to attain. The areas where the coating has flaked are considered to have light to medium rust with minor pitting. The pitting was previously noted in the 1998, 2003 and 2008 reports. However, there appears to be no significant progression of the rust when comparing the 2008 and the 2013 inspection results. The function of the outlet vent steel is maintained with the existing condition.

### VCC/MSB Annulus

The VCC/MSB annulus from the air outlet assemblies to the air inlet hole in the floor of the VCC was free of blockage.

- VCC Liner Interior Surface

The VCC liner interior exhibited small areas of light rust near the air outlets and light rust or discoloration approximately midway down. The circumferential weld exhibited some intermittent light rust or coating discoloration. There was no noticeable change in coating degradation when compared to the 2008 inspection video.

- MSB Exterior Surface

As expected, the epoxy enamel coating near the top of the MSB exhibited some flaking and light rust bleed through the weld heat-affected zone. However, there was not a noticeable increase in degraded coating as compared to the 2008 inspection results. The condition of the remaining coated surface area of the MSB was very good. There was apparent discoloration of the epoxy (originally light blue), however the coating has maintained its gloss and is not experiencing any chalking. There were several areas near the bottom of the MSB, which were previously noted in 1998, 2003, and 2008, where light rust bleed through is evident; however, the rusting has not progressed significantly.

### Air Inlet Assembly Interior Surfaces

The air inlet assemblies, from the protective screens to the air inlet hole in the floor of the VCC, were found to be free of blockage. Minor debris (paint chips, leaves, small twigs) were identified in the air inlet assembly. The VCC inlet steel surfaces exhibited some light to medium rusting, as noted in the 1998, 2003, and 2008 inspections. There was no significant change in the condition of the VCC inlet liner steel.

## **SUMMARY EVALUATION**

Evaluation of the results from the VCC interior inspection on VSC serial number CVCC-24-01 after 20 years in service indicates the following:

- The internal air flow paths inside the VCC were found to be free of obstruction. This is consistent with the daily thermal performance monitoring data. Thus, there is indication that the thermal performance of the cask has not degraded and that the cask is operating properly.
- There were no significant changes from the results summarized in the 2008 inspection.
- The MSB shell exterior surface was found to exhibit some small local areas of surface rust which are of no consequence since the shell thickness was designed to withstand more than 50 years of corrosion in an uncoated condition in a coastal, marine environment.
- Flaking of the epoxy enamel top coat on the MSB was observed at the top and bottom of the shell. This top coat was added to facilitate decontamination of the MSB exterior surface following removal from the spent fuel pool during loading. The flaking epoxy enamel top coat is of no design significance, as the top coat is no longer functionally required. Operability continues to be demonstrated by the daily surveillances which assure that the air inlet/outlet screens are free from blockage and verify satisfactory cask thermal performance.
- Surface rust was noted on the interior surfaces of the air inlet and air outlet assemblies. These assemblies serve only as a concrete form during fabrication and perform no structural or shielding function.
- The VCC liner interior surfaces exhibited small areas of surface rust near the air outlet assemblies and at the mid length. The VCC liner performs a structural and shielding function during use. The rusting noted will not affect the VCC liner's ability to perform its function since:
  - The light rust observed had no perceptible depth. Therefore, the liner's structural strength is not affected.
  - The reduction in wall thickness due to rusting is not a shielding concern because the rate of fuel decay exceeds the corrosion rate of the liner material.
- Air Inlet Assemblies – Minor debris that has no impact on air flow pathway observed.

## **CONCLUSION**

The VSC cooling paths were found to be free of air flow blockage. The VCC air inlet and air outlet assemblies, the VCC interior surfaces and the MSB exterior surfaces were found to be in good condition and are considered to be normal for the VSC service environment and the specified materials of construction described in the safety analysis report (SAR). The inspection did not identify any degradation mechanisms affecting system performance that were not identified in the SAR.

The VSC was found to be performing as described in the SAR, and no additional degradation mechanisms affecting system performance were identified.